

equinox

# **User Manul for Portable Mesh Nebulizer**

Model No. : EQ-MN-86

- ★ Thank you very much for selecting our Mesh Nebulizer EQ-MN-86.
- ★ In order to make sure that this product can be used correctly, please read this manual carefully before use.
- ★ Please keep this manual in a convenient place for easy access.
- ★ Illustrations contained in this user manual are schematic.

## I. Important Safety Notes

- ▲ For the type, dose, and regimen of the medication, be sure to follow the instructions of a doctor.
- ▲ The use of this product for children and persons with special needs must be carried out under correct guidance and supervision.
- ▲ This unit is only used for specified purposes, only for nebulization. Do not use the device for any other purpose.
- ▲ Clean and disinfect the medication cup and accessories before using or not using the unit for quite a while
- ▲ Please stop using the device if the components are damaged or fall into the water accidentally.

## II Product

### 1. Product Name:

Portable Mesh Nebulizer

### 2. Model No.:

EQ-MN-86

### 3. Working Principle and Mechanism

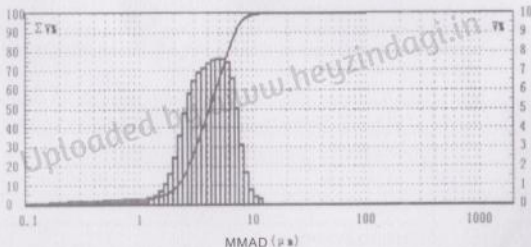
The portable nebulizer is driven by the rapid oscillation of the circuit, making the piezoelectric ceramic. The working principle of the portable atomizer is driven by the rapid oscillation of the circuit, making the piezoelectric ceramic transducer chip resonant oscillation, which drives the micro-metal mesh rapid oscillation, the liquid through the metal mesh on the tiny mesh ( $3\mu\text{m}$ ) And is quickly pop-up, the formation of numerous tiny atomized particles, through the suction mask or nozzle to guide the patient's respiratory system, in order to achieve the purpose of inhalation therapy. Respiratory system is an open system, the liquid is atomized into particles, the patient inhalation of these drug fog, the drug can be directly adsorbed deposited in the patient's mouth, throat, trachea, bronchi, alveoli, etc., by its mucous membrane Tissue absorption to achieve the purpose of treatment.

### 4. Specification

Power Supply	DC 3.7V(Inbulit lithium battery) or DC5.0V with AC adapter
Power Consumption	< 2.0W
Nebulization Rate	> 0.3ml/min
MMAD	1~5 $\mu\text{m}$
Working Frequency	110kHz $\pm$ 10kHz
MMAD	2.5 $\pm$ 30% $\mu\text{m}$
Medication Liquid Temperature	$\leq$ 45 $^{\circ}\text{C}$
Medication Cup Capacity	6ml
Product Size/Weight	39mm(L) $\times$ 62mm(w) $\times$ 68mm(H)/40g (Including Batteries)
Security Level	Internal power supply B type equipment

Working Environment	Temperature : 5°C~40°C Relative Humidity : ≤80%R.H. Non-condensing state Atmospheric pressure : (86.0~106.0)kPa
Storage/delivery Environment	Temperature : -20°C~55°C Relative Humidity : ≤80%R.H. Non-condensing state Atmospheric pressure : (70.0~106.0)kPa
Batteries Life	The remaining capacity keeps more than 80% of the initial capacity after 300 cycles of use

The median particle size in this nebulizer is measured with 0.9% physiological saline under conditions of a temperature of  $25 \pm 3^\circ\text{C}$  and a humidity of  $60\% \pm 5\%$  R.H. And the equivalent particle size distribution curve of the fog particles measured under these conditions is as follows



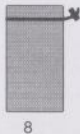
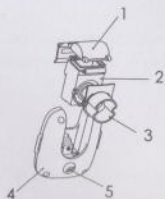
Note: the horizontal axis is the particle size value, the value is logarithmic distribution; The left vertical axis is the cumulative percentage of the volume, corresponding to the rising trend of the curve;

The right vertical axis is the volume percentage of a certain section, corresponding to the histogram or undulating

##### 5. Product Composition

EQ-MN-86 is composed mainly by the main unit and nebulizer device, medication cup, Micro USB cable, threaded components, Micro USB cable and accessories (masks and spray nozzle)

## 6. Product Contents



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No	Name	Qty
1	Lid	1
2	Medication cup	1
3	Spray Nozzle	1
4	Unit	1
5	Power Switch	1
6	Child Mask	1
7	Adult Mask	1
8	Velvet Bag	1

No	Name	Qty
9	USB cable	1
10	Warranty Card	1
11	User Manual	1

**⚠ Note:** Please refer to the configuration list

## 7. Applicable scope

For medical institutions and family for atomization. The atomizer for drug inhalation therapy. Applicable to adults, the elderly breathing, infants and children should be used under adult supervision

### iii. Installation Instructions

1. Remove all packings, then remove the unit and accessories.
2. Installation of accessories, the medication port has been assembled on the main unit, no need to reassemble, the headband tightness can be adjusted to individual's preference(as shown in the blow picture)



Connect the mask

**▲ Note:** Clean, disinfect, dry all parts before installation

#### 3. Power Supply

The device is not equipped with power adapter, please use the regular standard adapter that should comply with GB 9706.1-2 007 or IEC 60601-1: 2012 requirements

- 1) The technical parameters of the power adapter should conform with output DC 5.0V/1.0A
  - 2) The power system of the device is equipped with rechargeable Lithium titanate battery.
  - 3) Please connect the USB cable to the mini connector, the other terminal connect to the power adapter.
- It can work normally when charging up to the working voltage(shown in Figure 1)



(Figure 1 Charging diagram)

#### 4) Battery Charging

When in low battery status, the blue indicator lights up and off gradually. At this time, please recharge the lithium battery with 5A/1A adaptor for about 35 minute. Power adaptor is suitable for recharging. When not fully recharged, the green indicator lights up and off gradually; when fully charged, the green keep on.

#### ⚠ Note :

Lithium battery has been loaded, do not privately disassemble.

#### ⚠ Note :

- 1) When the low battery is detected, blue light flashes slowly, please charge it in time.
- 2) Fully charged lithium battery, continuous working time about 30 minute.
- 3) Keep charging the device at least once per month during the storage period exceed one month.

#### ⚠ Warning:

Please dispose the used batteries according to the local environmental regulation. Do not dispose together with the rubbish to avoid environment pollution.

Do not dismantle or repair the equipment or components, do not dismantle, replace the battery. If you need to replace the battery, please consult or purchase from Equinox Overseas Private Limited

## IV. USE Instructions

### 1. Preparation:

After each time use of the machine, please clean and disinfect the medication cup, spray nozzle and other accessories. Then please confirm the status of cleaning and disinfection before each use

### 2. Inject the liquid: open the lip and Inject liquid in to the medication cup, then screw the lid ( as the following figure)

Note: Follow the doctor's advice to inject the liquid, do not exceed the maximum capacity of the liquid cup, the maximum capacity can be seen on liquid cup scale. After injecting the liquid, do not open the liquid cup lid, so as not to spill liquid.



chart 1

### 3. Nebulization

- 1) Click " ON/OFF "to power on, start nebulization.
- 2) Hold the nebulizer to keep the liquid contact with the nebulization mesh. The user takes the following one inhalation methods according to individual needs. When using, do not make the headband too tight, please adjust to a suitable tightness as you need.



By mask



- 3) Slowly taking a deep breath and then breathing in drugs.
- 4) The nebulizer can set the working time to 10 minutes, and it will shut down automatically after 10 minutes. If you need to continue to use, press 1 times to start nebulizing. Please make sure there is enough liquid in the liquid cup.
- 5) After nebulization, press the "ON/OFF" button to turn off and stop the nebulization. Pour out the trace of residual liquid in the liquid cups and do not reuse.

Press and hold  
the PRESS key

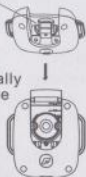


Press and hold  
the PRESS key



medication cup  
fixing groove

When installing the medication bottle, please slide it vertically into the fixture groove and do not tilt, make sure the whole medication bottle is well pressed.



- 6) Use clearwater to clean the medication cup, spray nozzle, liquid cup lid, accessories, and then follow the recommended method of disinfection.

**▲ Note:**

- 1) Host nebulizer to keep the liquid and nebulization mesh disc in full contact. slight swing does not affect the use but do not shake the equipment in the process of nebulization.
- 2) Receiving treatment according to the doctors' recommendation. Keep quiet and relaxed in the course of treatment.
- 3) If you need to replace the suction method, you need to replace the suction mask. Please clean the spray interface section after each use, (see "Cleaning and Disinfection").
- 4) Liquid will be coagulated around the nozzle and mesh disc, which will affect the nebulization effect after nebulization. It should stop nebulization, remove the mouthpiece and other accessories. Then use a clean medical gauze to wipe the residue. Do not touch the mesh disc center spray area to prevent damage to the mesh disc.
- 5) When using, do not make the headband too tight, please adjust to a suitable tightness as you need.
- 6) Please do keep it vertically pressed when installing the medication bottle.

## V. Cleaning and Disinfection

Please disinfect the medication cup, spray nozzle, lid, mouthpiece and masks after using.

According to GB/T27949-2011 Medical Device Disinfectants Hygienic Requirements and WS/T 367-2012 Disinfection Technical Guidelines, specific methods for cleaning and disinfecting are as following:

1. Please cut off the power before cleaning the main unit:

- 1) Please clean the accessories such as medication cup, assembly and masks removed from the main unit in a container with purified water (below 40°C) for around 5 min;
- 2) Please use the clean medical gauze to dry the accessories after cleaning;
- 3) Please wipe the main unit. Please wipe dirt and residue if any at the electrode connection place with clean medical gauze and put it dry in the air;
- 4) Please store the device and accessories in dry ventilated place in case of contamination.

**▲ Note:**

- Please avoid cleaning the main unit in water in case water entering;
- Please keep the main unit and accessories dry and clean for the following safe use;
- Please avoid using distilled water or multiple filtering water.

2. Disinfection

Please disinfect medication cup, spray lid nozzle and masks after each time using, disinfecting methods are as following:

- 1) Please clean or disinfect the medication cup assembly and masks in purified water (below 40°C) or in medical disinfectant.
  - a. Please soak the medication cup assembly and masks into purified water (below 40°C) or medical disinfectant for around 30 min, then wash each accessories with warm water (Below 40°C) added Non-toxic detergent;
  - b. Please use clean medical gauze to dry each accessories;
  - c. Please wipe and disinfect the surface of masks with Medicinal alcohol 75% and dry them in the air;
- 2) Please moist heat sterilize the medication cup assembly and masks in steam sterilizing pan specially used for feeding bottle disinfection for around 10 min. Please refer to the using manual.

**▲ Note:**

- Please avoid cleaning the main unit in water in case water entering;
- Please keep the main unit and accessories dry and clean for the following safe use;
- Please avoid using distilled water or multiple filtering water.

## VI. Storage and Maintenance

### 1. Nebulizer Storage

#### 1) Storage conditions:

- a. Environment temperature:  $-20^{\circ}\text{C}\sim 55^{\circ}\text{C}$ ;
- b. Relative humidity:  $\leq 80\%\text{R.H.}$ ;
- c. Atmospheric:  $(70.0\sim 106.0)\text{kPa}$ ;
- d. others: Non-corrosive gas, good ventilation, avoid high temperature, humidity and direct sunlight.

#### 2) Storage instructions:

- a. The device is valid for 5 years in the above mentioned storage condition.
- b. The nebulizer should be promptly cleaned and disinfected after use, the medication cup and other accessories should store into the packing box after completely drying. Stored in the required environmental condition, avoiding impact.

### 2. Nebulizer Maintenance

#### 1) Normal working conditions

- a. Environment temperature:  $5^{\circ}\text{C}\sim 40^{\circ}\text{C}$ ;
- b. Relative humidity:  $\leq 80\%\text{R.H.}$ , non-condensing state.
- c. Atmospheric pressure:  $(86.0\sim 106.0)\text{kPa}$ ;
- d. Power: DC3.7V(Lithium batteries) or AC power adapter (purchased by user, technical specification please refer to Chapter 2 for details).

#### 2) Maintenance Instructions:

- a. Please use nebulizer under normal conditions;
- b. Do not use the nebulizer near the heating device or open flame. Do not use a microwave oven, oven, fan and other dry nebulizer and accessories.


- c. Do not expose the nebulizer and accessories to corrosive liquids and gases.
- d. Do not wrap the power cord around the unit.
- e. When using a nebulizer, if any irregularities are encountered, seek a solution in accordance with Chapter 8. If the nebulizer still does not work properly, please contact our company or the dealer.


## VII Contraindications, Precautions, Notice and Warning

### 1. Contraindications

- 1) This product is not suitable for Pentamidine drugs.
- 2) Pulmonary edema patients are prohibited to use.
- 3) Acute asthma and acute pulmonary infarction episodes are prohibited to use.

### 2. Notice and suggestion

● The nebulizer is a medical device and is intended for human use only. Please follow the instructions in the manual or under the guidance of a doctor, infants and young children and special care crowd should be used under the supervision of the guardian.	
● Please use original parts and accessories. Warranty service is not provided for damage caused by accessory beyond our list and damaged by the user's personal causes.	
● Please refer to the "Troubleshooting" section when there are problems and contact the service center for maintenance. Do not attempt to repair the equipment personally.	
● Please clean and disinfect the unit after use and refer to the clean and disinfect chapter.	
● The nebulizer is for medication atomization. The nebulizer is for medication atomization.	
● Please do not place or move the device when there is liquid inside medication cup.	
● Please confirm all the accessories are intact before use it.	
● The nozzle is disposable accessory, only for single person using to avoid cross-infection. For single person use, max reusable time up to 3 times.	
● Try to keep the liquid fully reach the mesh disc when use.	
● Don't use the device at shower room.	

● Do not use the unit near flammable gas atmospheres or near oxygen and anesthetic mixtures	
● The instrument is expected to be used in radioactive radiation harassment controlled electromagnetic environment, as far as possible away from the source of harassment.	
● Do not use the machine in a high temperature environment, or it may cause trouble and fire.	
● Keep the device and parts away from strong vibrations, such as impact.	
● Please do not use liquid which contains esters, oil or suspended particles, including herbal extract.	
● Do not wash the whole unit with running water to avoid water come inside the device, especially the USB connector.	
● Do not use the microwave ovens to dry or disinfect the unit, or may cause fire.	
● Please place it in a place where children, infants and psychotic patients can not reach it.	
● Please use qualified manufacturers of lithium battery power charger(output5.0V/1.0A).	
● Do not touch the center of spray mesh by hand or other sharp objects.May cause damage, and can not be used	
● The nebulizer has no moisture and dust function, and the product should not be stored in a wet or dusty environment	
● Do not drop and avoid strong impact on the device, medication cup, or may cause damage, and can not be used.	
● Do not disassemble, repair, modify the device, or may cause electric shock, leakage, fire.	
● Dispose the wasted device and accessories in accordance with local regulations. Illegal disposal may pollute environment. Users can disinfect the device as general waste recycling	

### 3. Warning

● Please refer to the doctor before use the device if you have diabetes or other illnesses.	⚠
● Using and purchasing the device should be advised by a doctor, please refer to the doctor's advisements regarding the medication type, dosing and way of use.	
● Please stop using the device if feeling uncomfortable and ask for a doctor for help.	
● Volatile oil are not allowed, may cause damage to module.	
● Water-soluble medication and saline dilutions medication are allowed to nebulization, or may cause bronchospasm.	
● Oily medication are not allowed.	
● The device is not workable for respiration anesthesia system and respirator system.	⚠
● Do not spill liquid to the device to avoid leakage, the possibility of electric shock and cause malfunction, failure to use.	



Please avoid higher backward inclination angle. If the solution within the medication cup fails to contact the mesh, the machine will not work. (Please refer to the diagram)

## VIII. Trouble Shooting tips

Trouble shooting for nebulizer		
Item	Trouble	Possible cause/solution
1	Dose not work when turn on	1) Check whether the nebulizer is charged, when the blue and green indicator is always on, please recharge the device. 2) Check if the medication cup been full filled.
2	Low nebulization	1) Check if the medication cup been filled with right medication which should be water-solubility, non-corrosive medication. 2) Check whether the amount of liquid is too enough. 3) Tilt the unit, so that the medication in contact with the spray mesh. 4) The spray mesh maybe blocked, you can drop 2 or 3 drops of white vinegar into the medication cup with 3-6ml water, then fully nebulized. Clean the medication cup to disinfection for next nebulization.











3	What medication is more suitable for nebulization	<p>1)Please refer to and follow doctor's advise.</p> <p>2)Only doctors can advise the users what drug are used for treatment.</p> <p>3)Don't use over sticky medication.</p>
4	Some medication residual	It is a normal sign, if there is some strange noises or the unit shut off due to insufficient medication, please stop nebulization.
5	Special care for babies and childrens	<p>1)Please choose the babies mask to cover mouth and nose for better effect.</p> <p>2)Please choose kids mask to cover mouth and nose for better effect.</p> <p>Note:Children and babies should be helped and watched by a adult when using the device.keep it away from the children when no use.</p>
6	Each user needs in dividul consumable item	Each user should use individual consumable items, including mask, mouthpiece, nosepiece and eye mask.

## IX. After-sales service

Equinox will replace or repair free of cost any part of the product which is defective or cause of failure in the performance within 18 month of purchase.

# X. Symbol description & Electromagnetic compatibility

## 1. Signs and symbols

 <p>Refer to instruction manual/ booklet NOTE On ME EQUIPMENT</p>	 <p>Separate collection for electrical and electronic equipment</p>	 <p>General imperative</p>	 <p>No toxic and harmful substances and elements</p>
 <p>Upward</p>	 <p>Do not disassemble</p>	 <p>Avoid Moisture</p>	 <p>The application part of Type BF</p>
 <p>Be careful of electric shock</p>	 <p>Note, Warning, refer to enclosed file</p>		

## 2. Electromagnetic compatibility

### 1) Electromagnetic compatibility.

<p>Guidance and Manufactures declaration-electromagnetic</p>		
<p>This device is intended for use in the electromagnetic environment specified below. The user of this device should assure that is used in such an environment.</p>		
<p>Emissions text</p>	<p>Compliance</p>	<p>Electromagnetic environment-Guidance</p>
<p>RF emissions GB 4824</p>	<p>Group 1</p>	<p>This device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</p>




RF emissions GB 4824	B	This device is suitable use in all establishments, including domestic establishments and those directly connected to the buildings used for domestic purpose.
Harmonic emissions GB 17625.1	N/A	
Voltage fluctuations /flicker emissions GB 17625.2	N/A	

#### Guidance and Manufactures declaration-electromagnetic immunity

This device is intended for use in the electromagnetic environment specified below  
The user of this device should assure that is used in such an environment.

Immunity test	IEC 60601test level	Compliance level	Electromagnetic environment guidance
Electrostatic discharge GB/T 17626.2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kVair	The ground shall be wood, concrete or tile, and if the ground is covered with synthetic material, the relative humidity shall be at least 30%
Electrical fast transient burst GB/T 17626.4	± 2kV power ± 1kV input/output	N/A	N/A
Surge GB/T 17626.5	± 1 kV cable to cable ± 2 kV cable to the ground	N/A	N/A
Voltage dips short interruptions and voltage variations on power cable GB/T 17626.11	<5%UT continuous 0.5 cycle (>95% shortly dips on UT) 40% UT, continuous 5 cycle (60% shortly dips on UT) 70% UT, continuous 25 cycle(30% shortly dips on UT) <5%UT, continuous 5s (>95% shortly dips on UT)	N/A	N/A

Power frequency magnetic field (GB/T 17626.8)	3A/m 50Hz, 60Hz	3A/m 50Hz, 60Hz	Power frequency magnetic field should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Conducted RF GB/T 17626.6	3V rms 15KHz to 80 MHz	3V/m	<p>Portable and mobile radio-frequency communication equipment should not be used close to any part of this portable mesh nebulizer less than recommended, isolation distances, including cables. The isolation distance is recommended according to the following formula:</p> $d = 1.2\sqrt{P} \quad 150 \text{ kHz} \sim 80 \text{ MHz}$ $d = 1.2\sqrt{P} \quad 80 \text{ MHz} \sim 800 \text{ MHz}$ $d = 2.3\sqrt{P} \quad 800 \text{ MHz} \sim 2.5 \text{ GHz}$ <p>Note:</p> <p>p—is the maximum power in( W),  d—is the minimum separation distance in (m).  The field strength of the fixed radio frequency transmitter is determined by the survey a of the electromagnetic field. Each frequency range b should be lower than the current frequency.  It will be affect when near to the equipment which have the following marks </p>
Radiated RF GB/T 17626.3	3V/m 80MHz to 2.5GHz	3V/m	

**NOTE:**

UT means the Alternating current network voltage before applying test voltage.

1. At the 80MHz and 800MHz frequency stores, the formula of high frequency band is adopted. The guidance are not suitable for all situation. The electromagnetic transmission is affected by the building, object and body's respiration and reflection.

1. stationary transmitter, such as cell phone, Ground mobile radio base station, amateur radio, amplitude modulated and FM radio and television broadcast, their field is not accurate in theory. To assess the electromagnetic environment of the stationary RF transmitter. The investigation of electromagnetic fields should be considered. If the field intensity of the place where the product is measured is higher than the above applicable RF level, the equipment should be observed to verify its normal operation. If abnormal performance is observed, additional measures should be taken as required, such as readjustment of the direction or position of the portable nebulizer.

2. In the range of 150kHz ~ 80MHz, field intensity should be less than 3V/m.

Recommended separation distances between our portable nebulizer and portable or mobile FR communication equipment.

This device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of our equipment can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and our product as recommended below according to the maximum output power of the communications equipment.

maximum output power rate of transmitters (w)	separation distance according to frequency of transmitter		
	150 kHz ~ 80 MHz $d = 1.2\sqrt{P}$	80 MHz ~ 800 MHz $d = 1.2\sqrt{P}$	800 MHz ~ 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where  $P$  is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

#### ⚠ Precautions

- 1) The device shall comply with YY 0505-2012 《Medical Electrical Equipment Part 1-2 : Safety - General requirements - Parallel standards: Electromagnetic compatibility requirements and testing》. At the same time fulfill with GB4824-2013 《Industrial Science and Medical (ISM) RF equipment harassment characteristics of the limits and measurement methods》 in a group B requirements.
- 2) Portable and mobile RF communication equipment may affect the performance of the nebulizer, avoid strong electromagnetic interference when using, such as close to mobile phones, microwave ovens and so on.

#### ⚠ Warning

- 1) Equipment or systems should not be used or stacked with other equipment, if they must be close to or stacked use, it should be observed that the verification in its use of the configuration can be normal operation.
- 2) Expect where the manufacturer of the unit is sold as a spare part for internal components, accessories and cables may cause an increase in the emission of this nebulizer or a reduction in immunity.